

# Device/User Interface Software Requirements For GDP 225D Frame Sync

Version 1.0

June 17, 1997

**Submitted by:**

\_\_\_\_\_  
Software Engineer

\_\_\_\_\_  
Date

**Approvals:**

\_\_\_\_\_  
Hardware Engineer

\_\_\_\_\_  
Date

\_\_\_\_\_  
Operations

\_\_\_\_\_  
Date

\_\_\_\_\_  
Project Lead

\_\_\_\_\_  
Date

Final and Signed  
06/17/97



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## 1.0 Introduction

This document provides device and user interface requirements for the GDP 225D Frame Sync.

## 2.0 Required Functionality

The Model 225D is a PCM Frame Synchronizer unit which is used to acquire PCM Telemetry Data at a minor or major frame rate. It accepts serial data and clock then provides reconstructed data samples to a parallel output connector along with word #, frame #, major and minor frame status, and timing strobes.

## 3.0 Parameter Ranges

The AGS/SGS requirements differ from the device capabilities in that the bit slip window and the Decommutator matrix will not be used.

## 4.0 Communications Protocol

RS-232 protocol will be used to communicate with this device from the data handling node computer. The baud rate = 19200 bps, data bits = 8, stop bits = 1, parity = none, flow control = none.

## 5.0 GUI Functionality

See Appendix A: Graphical User Interface Requirements

## 6.0 Command Scripting

See Appendix B: Scripting Requirements

## 7.0 High-level Status

The minimum set of parameters necessary to determine the 225D frame sync's high-level status are:

- Counters control lights indicating if minor and major frames in LOCK. Green light = in LOCK, red light = out of LOCK.
- Four Data Capture words

Counter checks should begin when a signal is detected. Counters and Data Capture words should be polled and reported every tenth of a second until LOS or until operation is ended.

## 8.0 Replacement Algorithm

If the instrument does not respond with the remote mode prompt, it is broken or not in remote mode.

## Appendix A: Graphical User Interface Requirements

The user will be able to access the following remote controllable features.

### Minor Frame Length:

Minimum 16 bits  
Maximum 262144 bits  
1024 bits (default)

### Frame Sync Check Errors:

Sets limits for synchronization errors for minor frame SEARCH and CHECK.

Minimum 0 errors (default)  
Maximum 30 errors

### Frame Sync Lock Errors:

Sets limits for synchronization errors for minor frame LOCK..

Minimum 0 errors (default)  
Maximum 30 errors

### Frame Sync Check Patterns:

Sets number of consecutive good minor FRAMES before entering LOCK mode.

Minimum 0 frames (default)  
Maximum 15 frames

### Frame Sync Lock Patterns:

Sets number of consecutive bad minor FRAMES before entering SEARCH mode.

Minimum 0 frames (default)  
Maximum 15 frames

### Frame Sync Operation:

| Operation                        | Op Code     |
|----------------------------------|-------------|
| None                             | 0           |
| AFS (Alternating Frame Sync)     | 1           |
| AFC (Automatic Detect & Correct) | 2 (default) |

### Input Data Polarity:

| Polarity | Op Code     |
|----------|-------------|
| Normal   | 0 (default) |
| Inverted | 1           |

### Input Source Select:

| Input Source | Op Code     |
|--------------|-------------|
| B (Ch. 2)    | 0           |
| A (Ch. 1)    | 1 (default) |

**Sync Position:**

Determine whether the frame sync pattern is positioned as the first or last word to be output.

| Position | Op Code     |
|----------|-------------|
| First    | 0 (default) |
| Last     | 1           |

**Sync Pattern:**

The up to 16 hexadecimal character sync pattern will be input left justified. Default = blank.

**Sync Mask:**

The up to 16 hexadecimal character sync mask will be input left justified.  
Default = FFFFFFFFFFFFFFFF.

**Input Data Code:**

| InputCode | Op Code     |
|-----------|-------------|
| NRZ-L     | 0 (default) |
| NRZ-M     | 1           |
| NRZ-S     | 2           |

**Recycle Sync Pattern:**

The up to 16 hexadecimal character recycle sync pattern will be input left justified.  
Default = blank.

**Recycle Sync Mask:**

The up to 16 hexadecimal character recycle sync mask will be input left justified.  
Default = FFFFFFFFFFFFFFFF.

**Subframe Sync Type:**

| Type                    | Op Code     |
|-------------------------|-------------|
| ID counter sync pattern | 0 (default) |
| Recycle pattern         | 1           |

**ID Counter Received:**

The orientation of the ID counter.

| ID        | Op Code     |
|-----------|-------------|
| LSB first | 0           |
| MSB first | 1 (default) |

**Subframe Counter Start Number:**

Minimum bit 0 (default)  
Maximum bit 511

**Subframe Counter End Number:**

Minimum bit 0  
Maximum bit 511 (default)

**Subframe counter direction:**

| Direction | Op Code     |
|-----------|-------------|
| Down      | 0           |
| Up        | 1 (default) |

**Subframe Sync Bit One Position:**

Allows selection of where the first bit of the Subframe sync pattern will occur, the first bit in the frame is bit 0.

Minimum bit 0 (default)  
Maximum bit 262143

**Subframe Sync Word Length:**

The subframe pattern length range is determined by which sync type was selected.

ID:

Minimum bit 1 (default)  
Maximum bit 9

Recycle:

Minimum bit 2 (default)  
Maximum bit 32

**Check Errors:**

Select the number of errors permissible during search and check states.

Minimum 0 errors (default)  
Maximum 14 errors

**Lock Errors:**

Select the number of errors permissible during lock states.

Minimum 0 errors (default)  
Maximum 14 errors

**Check Patterns:**

The number of CHECK patterns that must be accepted before going in lock state.

Minimum 1 pattern (default)  
Maximum 15 patterns

**Lock Patterns:**

The number of consecutive unacceptable patterns before leaving lock state.

Minimum 0 patterns (default)  
Maximum 15 patterns

**Word Number:**

Paired with Frame Number, defines the information to be displayed by the Read Data Capture command. Four data capture words can be displayed.

Minimum word 0 (default)  
Maximum word 16383

**Frame Number:**

Paired with Word Number, defines the information to be displayed by the Read Data Capture command. Four data capture words can be displayed.

Minimum frame 0  
Maximum frame 511  
Disables frame match OFF (default)

**Display:**

Four Data Capture words.  
Minor and Major frame LOCK lights.



## Appendix B: Scripting Requirements

| Master  | Node   | Comments/Error Handling |
|---|--|-------------------------|
| Resource Request Specific<br>Parameter: unit number | Start<br><br>Check allocation table for unit number<br>Check for remote.<br><br>If available then<br>Mark unit as assigned to this Master<br>Reply " Unit # assigned"<br>Open log file<br>Retrieve configuration file from this Master<br>Else<br>Reply " Unit # not available"<br>End   |                         |
|   | Stop   |                         |
| Resource Request General                            | Start<br><br>Check allocation table for an available unit<br>using the least recently used method<br>Check for remote.<br><br>If available then<br>Mark unit as assigned to this Master<br>Reply " Unit # assigned"<br>Open log file<br>Retrieve configuration file from this Master<br>Else<br>Reply " No units available"<br>End |                         |
|   | Stop   |                         |

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| <b>Master</b>                           | <b>Node</b>  | <b>Comments/Error Handling</b>  |
|---|--|---|
| Setup<br>Parameter: unit number         | Start<br><br>Verify possession of unit by this Master<br><br>If not assigned to this Master then<br>Inform this Master<br>Stop<br>End<br><br>Load and Verify configuration file<br><br>If configuration file error then<br>Inform this Master<br>Stop<br>End<br><br>Stop | >> Operator intervention required<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br> |
| Start Support<br>Parameter: unit number | Start<br><br>Verify possession of unit by this Master<br><br>If not assigned to this Master then<br>Inform this Master<br>Stop<br>End<br><br>Begin polling counters and data capture at 10 pps rate.<br><br>Stop   | >> Operator intervention required   |
| Stop Support<br>Parameter: unit number  | Start<br><br>Verify possession of unit by this Master<br><br>If not assigned to this Master then<br>Inform this Master   | >> Operator intervention required   |

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| Master                             | Node   | Comments/Error Handling           |
|------------------------------------|--|-----------------------------------|
|                                    | Stop<br>End  |                                   |
| Takedown<br>Parameter: unit number | Stop<br>Start<br>Verify possession of unit by this Master<br><br>If not assigned to this Master then<br>Inform this Master<br>Stop<br>End<br><br>Mark unit as not assigned<br>Close log file<br>Send log file to this Master<br><br>Stop | >> Operator intervention required |